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AN EMPIRICAL ANALYSIS OF RURAL DEPOSIT MOBILIZATION IN SOUTH ASIA

by

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ABSTRACT

This paper presents GLS estimates for a regression model to explain rural deposits in India, Pakistan, Nepal and Sri Lanka. Per capita rural income, bank density and real rate of interest paid on deposits were significant variables. Access to bank branches is important because of the transaction costs of making and withdrawing deposits.

INTRODUCTION

The literature on rural finance in developing countries has been dominated during the past couple of decades by a preoccupation with extending loans to farmers. Policies have been implemented to push cheap loans into rural areas, and to assure lenders of adequate funds for such loans. Funds have frequently been provided through rediscount facilities of the Central Bank (often through concessionally-priced funds from international donors), or through regulations requiring financial institutions to either lend directly to farmers or make deposits with specialized farm lenders. Too frequently, deposit mobilization has been the forgotten half of financial intermediation (Vogel).

Three factors have contributed to a fundamental rethinking of rural finance. First, the failures and distortions of the cheap rural credit strategy have been amply documented (Adams, Graham and Von Pischke). Second, domestic resource mobilization is becoming more urgent out of necessity. Many countries face greater difficulty today in obtaining cheap foreign funds because they are already heavily indebted and the international sources simply don't have as many funds (Abbott). Third, the once pessimistic view that rural people are too poor to save has been challenged and low rural savings rates have been attributed more to inappropriate policies than to poverty (Adams).

Although the nature of the savings function in developing countries has been studied (Mikesell and Zinser), there is surprisingly little empirical evidence on financial savings.

Most studies of the determinants of rural financial savings have intuitive appeal but lack empirical testing (Dell'Amore).

This paper presents some results obtained from a study of rural deposits in four South Asian countries: India, Nepal, Pakistan and Sri Lanka. They were selected because they have emphasized rural banking, they have strong similarities in their economic, cultural and political background, and they furnish reasonably consistent data. The paper includes a short discussion of major issues related to rural deposit mobilization, the empirical model, some results, and conclusions.

DETERMINANTS OF RURAL DEPOSITS IN DEVELOPING COUNTRIES

Voluntary household savings in financial institutions represent an important issue for research because, unlike business and government savings, household savings are generally channeled into investments via financial markets. Rural financial intermediation may have an important impact on growth because in the early stages of development agriculture must supply resources for its own development and for other sectors. There is considerable growth potential for financial intermediation in many rural areas because they are either unbanked or lack attractive financial instruments.

The supply of funds provided by rural households to financial institutions depends on financial and nonfinancial factors. The most important nonfinancial factor may be income. The higher the income of rural households, the greater will be their ability to acquire temporary surpluses which can be deposited. Further-

more, the higher the income level, the greater will be the need to hold financial assets as a means of payment. Also income should be correlated with a wide variety of other factors related to banking such as monetization, urbanization and education.

Conveniently located deposit-taking institutions that cater to customers are likely to be an important financial factor affecting rural deposits. No studies were found that analyze transaction costs of making and withdrawing deposits in developing countries. Borrowing cost studies, however, show that noninterest costs may be as high or higher than interest charges, especially for small loans (Cuevas and Graham). These costs are high because of the explicit and implicit costs of travel and time spent in making several trips to the lender to negotiate a loan. It should be expected, therefore, that transaction costs will also be high for deposits. Conveniently located financial institutions can significantly reduce transaction costs and, thereby, increase the net return earned on deposits.

Besides reducing transaction costs, an extensive network of financial institutions may break down social barriers and speed the adoption of banking habits (Porter). Rural people need time to adjust to the idea of substituting formal institutions for face-to-face relations. Exposure to a neighborhood bank, getting acquainted with bank staff who may also live in the neighborhood, and observing others safely using banks may encourage potential depositors to place some savings in a financial institution.

The level and variability of real interest rates is the most controversial financial factor related to savings behavior. At

the theoretical level, the income and substitution effects of interest rate changes need to be evaluated. Some studies have shown that the substitution effect is more important than the income effect and that several countries have increased savings when a significant interest rate reform was undertaken (Lanyi and Saracoglu). One problem in resolving this issue is that many countries repress financial institutions and control interest rates so there is little information on which to make counterfactual judgements. When interest rates have been liberalized, the adjustment has frequently been too small and short-lived to determine the true impact.

The demand for loanable funds by financial institutions should be primarily determined by the demand for funds by creditworthy borrowers. There are several government policies, however, which influence this demand. First, governments license bank branches and frequently provide strong incentives for opening rural branches. These incentives can encourage banks to expand their networks even though costs may be high relative to the deposits mobilized and loans made. Second, interest rates paid on deposits and charged on loans are usually fixed and frequently the authorized spread between deposit and lending rates is low, but quotas and targets are imposed to expand agricultural lending. Disincentives in the interest rate structure are often offset with cheap central bank rediscount funds so many institutions use this source to reach loan targets. Lenders often try to circumvent the intent of financial policies

by channeling mobilized funds from surplus to deficit areas which frequently are urban centers.

The interest rate controls on loans creates a disequilibrium situation of excess demand for funds by borrowers so lenders must resort to nonmarket rationing of loans (Gonzalez-Vega). In this disequilibrium situation, changes in rural deposits associated with changes in deposit interest rates are likely to represent changes in the supply of funds to lenders up to the point where supply and demand for loanable funds is equated.

EMPIRICAL MODEL AND RESULTS

An empirical model was developed to explain the supply of funds provided to deposit-taking institutions in rural areas in these four countries. The relation between rural deposits and the explanatory variables was specified as follows:

$$D = F(Y, r, i, B)$$

where D = nominal value of rural deposits,

Y = agricultural GDP,

r = nominal interest rate,

i = rate of inflation, and

B = number of bank branches/offices in rural areas.

For the reasons given above, it was expected that agricultural GDP and number of branches will be positively related to deposits. All four countries have experienced nominal and real increases in agricultural GDP, although the growth rate has been fairly low in Nepal (World Bank, World Tables, 1983). The four countries have actively pursued the spread of banking services but by 1982/83

the number of rural bank offices per 10 thousand habitants was still only 0.40 for India, 0.25 for Nepal, 0.45 for Pakistan, and a relatively high 1.07 for Sri Lanka.

The expected sign for the interest rate variable was ambiguous. During the 1970-1981 period, real deposit rates of interest for twelve-month time deposits in India were negative for seven years, and for nine years in Pakistan (Fry). Some years these rates were a negative 3 to 5 percent. Real deposit rates in Nepal and Sri Lanka were also frequently negative, but became positive after they liberalized interest rate policies (1973 in Nepal and 1977 in Sri Lanka). Following reforms, rates generally varied in the positive 2 to 5 percent range with Sri Lanka tending to have the highest rates. Kim concluded that these reforms led to substantial increases in commercial bank saving deposits.

The model was fitted to pooled time-series cross-section data covering the twelve years 1970-1981. Data on nominal interest rates, rural deposits and branches were obtained from four country studies by Joshi, Motwani, Quaraishi, and de Silva. There are some definitional differences the chief one being that the Sri Lankan series covers only rural banks and credit societies as no data exist on commercial bank deposits in rural areas. Rural deposits as a percent of total deposits rose fairly steadily in this period except in Sri Lanka. But even in India, which has the highest rural deposit share, rural deposits had risen to only a third of total deposits by 1981.

Estimates of real interest rates and expected inflation were taken from Fry. Data on agricultural GDP at constant factor cost, implicit GDP deflators, and official exchange rates were taken from the World Bank World Tables, 1983. Rural population estimates were obtained by interpolating population census data reported in various issues of the U.N. Demographic Yearbook.

OLS regressions were run with various specifications of the basic model. F-tests were applied to the residual sums of squares of models that included country dummy variables, and interactions between them and each of the explanatory variables. The hypothesis of overall homogeneity of the regression was rejected. Coefficients for the country dummy variable and interaction between the dummy variable and the branching variable were statistically significant. Because the disturbance terms were assumed to be cross-sectionally correlated and time-wise autoregressive, a modified version of the generalized least-squares (GLS) regression was used to obtain efficient parameter estimates. This is a two-step process wherein the first step adjusts for auto-correlation in each country and the second step adjusts for cross-section correlation. A per capita specification of the variables in real terms was used to control for scale effects across the countries. The model was estimated in double-log form so the coefficients of the independent variables could be interpreted as elasticities.

Two empirical models were tested

(1) $$\ln D = a_0 + a_1 \ln Y + a_2 \ln B + a_3 \ln(r-i) + b_1 D_1 + b_2 D_2 + b_3 D_3 + c_{31} U_1 + c_{32} U_2 + c_{33} U_3$$

where D = per capita real rural (demand and savings) deposits,

Y = per capita agricultural GDP at constant factor cost,

r-i = real rate of interest on twelve-month time deposits, and

B = number of bank branches/offices per thousand inhabitants in rural areas

D_i = 1, i = 1,2,3 for Sri Lanka, Nepal and Pakistan, respectively, 0 otherwise. India was selected as the country of reference.

U_i = $D_i$lnB, D_i = dummy variable for the respective countries

This model implies that households react directly to real interest rates. An alternative formulation permitted a differential response to changes in nominal rates and inflation. The response lag to changes in nominal rates might be shorter than the lag in response to changes in inflation because the latter are filtered through the process of expectation formulation (Saracoglu). Therefore, the second model was specified as follows:

$$(2)\quad \ln D = a_0 + a_1 \ln Y + a_2 \ln B + a_4 \ln r + a_5 \ln i + b_1 D_1 + b_2 D_2 + b_3 D_3 + c_{31} U_1 + c_{32} U_2 + c_{33} U_3$$

The sign for the coefficient of nominal interest rate was expected to be positive, while the sign for the inflation variable was expected to be negative.

Table 1 presents the results of the generalized least squares regression for the two equations. The coefficients for all variables were of the predicted sign and all were statisti-

TABLE 1. -- GLS ESTIMATED COEFFICIENTS OF THE DEPOSIT FUNCTION[a/]

Parameter (Independent Variable)	Equation (1)			Equation (2)		
	Estimate	t-ratio[b/]	Standardized Estimate	Estimate	t-ratio[b/]	Standardized Estimate
a_0 (intercept)	-3.405	-7.855**	--	-3.250	-7.440**	--
a_1 (lnY)	0.528	5.438**	0.200	0.620	4.309**	0.235
a_2 (lnB)	1.306	18.815**	1.991	1.303	19.277**	1.986
a_3 (ln(r-i))	1.721	3.077**	0.056			
a_4 (ln(r))				0.056	0.580	0.021
a_5 (ln(i))				-0.012	-0.056	-0.000
b_1 (D_1)	-4.243	-8.818**	-1.776	-4.215	-9.048**	-1.764
b_2 (D_2)	-0.965	-1.165	-0.403	-0.915	-1.044	-0.383
b_3 (D_3)	-3.385	-9.320**	-1.416	-3.316	-9.383**	-1.388
c_{31} ($U_1 = D_1 \ln B$)	-0.592	-4.709**	-0.851	-0.587	-4.829**	-0.843
c_{32} ($U_2 = D_2 \ln B$)	-0.239	-1.387	-0.486	-0.222	-1.233	-0.452
c_{33} ($U_3 = D_3 \ln B$)	-0.513	-1.745*	-0.180	-0.407	-1.249	-0.143
$\bar{R}_2$	0.877			0.872		
F-Value	38.383**			33.115**		

a/ N=48. D_1, D_2, and D_3, are dummy variables where D_1 = 1 for Sri Lanka, 0 otherwise; D_2 = 1 for Nepal, 0 otherwise; and D_3 = 1 for Pakistan and 0 otherwise.

b/ Levels of Significance: ** = 0.01; * = 0.10.

cally significant except the dummy variable for Nepal. The explanatory power of the models was high and the F-values for the regressions were significant. The elasticities for branches and real deposit rates were greater than one. A 10 percent increase in the number of rural branches is associated with a 13 percent increase in rural deposits, while a similar increase in real deposit rate is associated with a 17 percent increase in deposits. The income variable was less elastic with a value of 0.5. These results suggest that changes in the two financial variables could have a significant impact on rural deposits. The coefficients for the interaction variables between countries and branches were negative and significant for two of the three countries. When the branching coefficient was adjusted for country interaction, there was a tendency for lower branch elasticity to be associated with higher bank density. This is a logical result since the impact of additional branches on rural deposits should be lower when bank density is higher.

The coefficients for the country dummy variables capture, among other things, the effect of different stages of financial deepening in these countries. In 1982, for example, the M_2/GDP ratio for India was 0.426, compared to 0.264 for Nepal, 0.302 for Sri Lanka and 0.419 for Pakistan (Meyer and Esguerra).

In the second model, the magnitudes of the coefficients for the common variables were similar and the explanatory power of the model was only slightly less than the first model. The coefficients for the interest rate and inflation variables had the expected sign but were insignificant. An F-test revealed

they were not statistically different from each other, a conclusion which lends support to the first model which simply combined the two variables. This result suggests that rural depositors respond to real rather than nominal interest rates and that they do not formulate separate expectations of nominal interest rates and inflation.

Standardized regression coefficients were calculated to account for the differences in standard errors of the estimates, and to evaluate the relative importance of the explanatory variables (Pindyck and Rubinfeld). The beta coefficients show that changes in transaction costs represented by branch density are relatively more important than changes in agricultural GDP and real interest rates in explaining the variation in rural deposits in these four countries.

CONCLUSIONS AND IMPLICATIONS

The results of this study conformed to economic theory regarding the expected response of rural deposits to rural income, access to banking facilities and interest rates paid on deposits. The supply of rural deposits will increase as the agricultural GDP rises but there is little that can be done in the short term to accelerate deposits by raising income. However, government licensing of bank branches and controls over interest rates are two financial factors that can have a short term impact. Branching appears to have the greatest impact because of the effect that accessibility to banks has on transaction costs of deposits. The convenience factor in making and withdrawing

deposits swamps the impact of interest rates when the banking index is low. It is likely that the interest rate elasticity will rise once depositors have convenient access to banks.

This study suggests that rural deposits can become an important source of funds for lending. Whether or not financial institutions can profitably mobilize these funds, however, depends on other financial policies such as lending interest rates, loan quotas and targets, and reserve requirements on deposits. If lending rates are fixed at low levels, if lenders are required to lend to activities with low interest rates, and if reserve requirements are high, lenders will be discouraged from the expensive task of expanding branches into the more sparsely settled or the lower income rural areas where the volume of deposits mobilized may be fairly low. Research is needed on the economics of rural banking to determine the appropriate policies and innovations required to make rural financial intermediation viable in the long run.

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